Bangalore

Water Supply and Sewerage Board

Tender Document for the “Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations under the jurisdiction of AEE E-1-2 sub division coming under AEE (UFW)-2 subdivision”.

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
Office of The Executive Engineer PS&BW Division
Margosa Road,Malleshwaram, Bangalore-560012

INVITATION FOR SHORT TERM TENDER-2nd call

(ONLY THROUGH E-PROCUREMENT TENDERING)

IFT No.: BWSSB/EE(UFW)-2/PB/ 174 / 2023- 24 Dtd: 08 - 08 -2023

E-Procurement Tender Notification

The **Executive Engineer, (UFW)-2 Division, BWSSB**, Bangalore-560012 invites Item Wise rate E-Procurement Tenders in Single Cover System from Eligible registered Contractors of BWSSB/KPWD/KUWS&DB/KUIDFC/BBMP/BDA/CEIG for the "Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations under the jurisdiction of AEE E-1-2 sub division coming under AEE (UFW)-2 subdivision".

Amount put to Tender-Rs.39.02 Lakhs

Period of view/Download of Tender Document is from 11- 08 -2023 to 17 - 08 -2023up to 16:00 hrs. Last Date for uploading tender documents is 17 - 08-2023. The details regarding the tender and participation in the e-procurement process can be obtained by logging on to website **www.kppp.karnataka.gov.in**

Executive Engineer
(UFW)-2 Division
18th cross, Margosa road
Malleswaram,
Bangalore-12.

TENDER REFERENCE	No.BWSSB/2023-24/OW/ WORK_INDENT7207.-2nd call
TENDER NAME	Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations under the jurisdiction of AEE E-1-2 sub division coming under AEE (UFW)-2 subdivision"
PERIOD OF VIEW/DOWNLOAD OF TENDER DOCUMENT	From: 11-08-2023 To: 17.08 .2023
LAST DATE FOR UPLOADING TENDER DOCUMENTS	17.08 .2023 16:00 hrs.
TIME AND DATE OF OPENING OF TENDERS:	18-08-2023 after 04.05 P.M
ADDRESS FOR COMMUNICATION	Office of Executive Engineer (UFW)-2 Division 18th cross, Margosa road Malleswaram, Bangalore.

BANGALORE WATER SUPPLY AND SEWERAGE BOARD

Office of The Executive Engineer (UFW)-2 Division

Margosa Road,Malleshwaram, Bangalore-560012

SECTION 1

INVITATION FOR SHORT TERM TENDER
(ONLY THROUGH KARNATAKA PUBLIC PROCUREMENT TENDERING http://kppp.karnataka.gov.in

(Short term tender)- 2nd Call

IFT No.: BWSSB/EE(UFW)-2/PB/ 174 / 2023- 24 Dtd: 08 - 08 - 2023

1. **The Executive Engineer, (UFW)-2 Division, BWSSB**, Bangalore-560055 invites tenders from eligible tenderers, for the works detailed in the Table below. The tenderers may submit tenders for any or all of the works given in the Table. Single Cover Tender procedure as per Rule28 of the KTPP Act shall be followed. The Tenderers are advised to note the minimum qualification criteria specified in Clause 3 of the Instructions to Tenderers to qualify for award of the contract.

   1. The Tenderers are required to pay the Earnest Money Deposit only through Karnataka public procurement portal only using any of the four modes.

      1. **Credit Card (Online Payment)**
      2. **Direct Debit Using Internet Banking (Online Payment)**
      3. **Remittance at the Bank Counter - Challan (Offline Payment)**
      4. **NEFT (National Electronic fund transfer) (Online payment).**

   The details regarding their capability to undertake the tender (as detailed in ITT Clause 4) and the price tender shall be uploaded in the website. Technical details will be opened on the date and time mentioned in ITT

clause 5 and evaluated. The price tender of the Tenderer, who is found to be qualified to execute the tendered works, will be opened on the date notified later. The Tenderers are advised to note the minimum qualification criteria specified in Clause 3 of the Instructions to Tenderers to qualify for award of the contract.

Tender documents may be downloaded from **http://kppp.karnataka.gov.in** website only. Interested tenderers may obtain further information at the same address.

1. Additional information related to Karnataka public procurement process can be obtained through the above-mentioned website or contact Karnataka public procurement helpdesk No.**080-2550 1216 / 2550 1227**.

Bidders can access tender documents from **http://kppp.karnataka.gov.in** website only and upload the required details; those are mentioned in different sections in the bid document in to electronic tender on the website. Scanned documents those are required to be furnished as per Section 2, 3 & 4 of the bid document shall be submitted through e- procurement**.**

2. The Tender processing fee once paid will not be refunded.

3. The Last date and time for Receipt of tenders will be on 17/ 08/2023 upto 4:00PM Hrs **and the date of opening of tender will be on 18/08/2023 after 4:05PM Hrs.**

1. Details of the work.

Sl. No	Name of the work	Amount put to tender Rs. (approx)	EMD 2%	Tender Processes sing fee	Period of completion
1	**"**Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations under the jurisdiction of AEE E-1-2 sub division coming under AEE	Rs.39,01,735/-	Rs.78,035/-	As per Karnataka public procurement portal	5 Months

	(UFW)-2 subdivision".				

2. Eligibility Criteria

a) Contractors should have Civil Contractor registration in BWSSB or PWD/KUWSSB/KPTCL/CPWD/ etc., Those who does have BWSSB registration can also participate in the tender provided they should get registered in Board in case the tender is awarded before the issue of work order.

b) Form of Tender as per KW-2 has to be uploaded.

c) Financial Turn over: The Tenderer should have in the last 5 years period achieved in Atleast Two financial years an average annual financial turnover of rupees not Less than **Rs.39.01 Lakhs *(Profit & Loss Account , Balance Sheet Certified, Audited by Registered Chartered Accountant are Mandatory)***.

d) Work Qualification: The Tenderer should have satisfactorily completed work (Supply, Installation & commissioning of Bulk Flow meter) to an extent of **40% of APT**

e) Third Party: The 3rd Party will be Nominated by BWSSB.

f) GST: The APT is Excluding GST. Hence the rates quoted shall be excluding GST.

g) Site Visit Report: The Intended Tenderer has to upload the Site Visit Report in the KPPP portal duly Signed by the Contractor & Concerned Sub divisional Officer which is Mandatory

h) The flowmeters should have the inbuild provision of both AC & DC power operations. 12-24V ACDC as per the site conditions AC supply will be provided or inbuild battery DC supply will be operated. The power backup through the external battery and by any external UPS shall not be allowed.

i) The flowmeters are remote mount type only and the 20 meters cable should be considered as standard.

j) Empty pipe detection and the advanced diagnostics are the mandatory options required in the flowmeter.

k) As per the technical specification vendor credentials along with Warranty certificate from manufacture for a period of 30 months shall be uploaded in the KPPP portal

l) Eligible tenderers will be qualified only if their available tender capacity is more than the total

tender value. The available tender capacity will be calculated as under:

Assessed available tender capacity = (A*N*2.5 - B)> Rs.39.01 L

Where,

A = Maximum value of Electrical / Mechanical engineering works executed in any one year during the last five years (updated to 2022-23 price level) taking into account the complete as well as works in progress.

N = Number of years prescribed for completion of the works for which Tenders are Invited.

B = Value, at 2022-23 price level, of existing commitments and on-going works to be

Completed during the next **1 years** (period of completion of the works for which

Tenders are invited)*

Uploading of the AATC certificate is compulsory.

Note: *The statements showing the value of existing commitments and ongoing works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

*The Form of Tender and demonstrated AATC should be duly signed by the Tenderer.

*The Balance Sheets for the corresponding annual turnover should be enclosed.

3. The successful bidder would be required to give performance **bank guarantee of 5%** of the contract amount plus additional security for unbalanced bid amount from a Nationalized / Scheduled Indian Bank, with jurisdiction at Bangalore as specified, towards guarantee for completion of work within the stipulated period.

4. Applications / requisitions from joint venture Firms are not acceptable.

5. Bangalore Water Supply and Sewerage Board (BWSSB) reserve the right to cancel the entire or part of this process of invitation at any time without assigning any reason.

6. For any additional information regarding the above tender, the firms who are interested to quote, may contact office of the undersigned at the office address given below on all working days during office hours (10:30hours to 17:00 hours).

7. List of documents to support qualification of bidder is to be uploaded to the Karnataka public procurement website **http://kppp.karnataka.gov.in** Bidders shall submit offers that comply with the requirements of the bid document, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered. The attention of the

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bidders is drawn to clause 23 regarding the rejection of the bids, which are not substantially responsive to the requirement of the bid document.

8. Other details can be seen in the tender documents. Further details may be had from this office during the office hours on all working days. Corrigendum/Addendum/Modification/corrections, if any, will be published in the Web site only.

9. Tenderers shall submit offers that comply with the requirements of the bid document.

Corrigendum / Modification / Corrections, if any will be published on the website only.

10. Tenderer should inspect the site for its conditions and should upload the site inspection letter duly signed by the concerned Assistant Executive Engineer. Not uploading the same, will lead to rejection of the Tender.

Executive Engineer
(UFW)-2 Division
18th cross, Margosa
Road Malleswaram,
Bangalore

SECTION 2: INSTRUCTIONS TO TENDERERS (ITT)

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A. General

1. Scope of Tender

1.1 The ***Executive Engineer EE(UFW-2) Division*** (Referred to as Employer in these documents) invites tenders following Single cover e-procurement procedure, from eligible tenderers, for the construction of works (as defined in these documents and referred to as "the work") detailed in the Table given in the Invitation for Tenders (IFT).

2. Eligible Tenderers

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka

2.2 Tenderer has to furnish **Form of Tender which is Mandatory**

2.3 Contractors should have Electrical **contractor license** in BWSSB or KPWD/KUWSDB or equivalent etc., Those who does not have BWSSB registration can also participate in the tender provided they should get registered in board in case the tender is awarded before the issue of work order.

3. Qualification of the Tenderer:

3.1 All tenderers shall provide the requested information accurately and in sufficient detail in Section 3: Form of Tender and Qualification information.

3.2 To qualify for award of this contract, each tenderer in its name should have in the last five years i.e. **2018-19 to 2022-2023)**

(a) Achieved in at least two financial years an average annual financial turnover (in all classes of Electrical/Mechanical Engineering works only) of **Rs.39.02Lakhs.**

(b) satisfactorily completed, as prime contractor, at least one work such as supply erection/installation and commissioning of Bulk Flow meter of value not less than 40% of APT (in any one year during last 5 years).

(c) Deleted
(d) Deleted

3.3 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under:

Assessed available tender capacity = (A*N*2.5 - B)>39.02 lakhs

Where

A = Maximum value of Electrical / Mechanical engineering works executed in any one year during the last five years (updated to 2022-23 price level) taking into account the complete as well as works in progress.

N = Number of years prescribed for completion of the works for which Tenders are Invited.

B = Value, at 2022-23 price level, of existing commitments and on-going works to be Completed during the next **1 years** (period of completion of the works for which Tenders are invited)*

Note: *The statements showing the value of existing commitments and ongoing works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

*The Form of Tender and demonstrated AATC should be duly signed by the Tenderer.

*The Balance Sheets for the corresponding annual turnover should be enclosed.

3.4 Even though the renderers meet the above criteria, they are subject to be disqualified if they have:

- Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or
- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

5. Cost of Tendering:

5.1 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible and liable for those costs.

6. Site visit:

6.1 The Tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all

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information that may be necessary for preparing the Tender and entering into a contract for Installation and construction of the Works. The cost of visiting the Site shall be at the Tenderer's own expense.

B. Tender documents

4. Content of Tender documents

4.1 The set of tender documents shall have all the Sections given in Page 2:

4.2 Both the sets should be completed and returned with the tender.

5. Amendment of Tender documents

5.1 Before the deadline for submission of tenders, the Employer may modify the tender documents by issuing addenda.

5.2 Any addendum thus issued shall be part of the tender documents and shall be communicated in writing or by cable to all the purchasers of the tender documents.

5.3 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of tenders, in accordance with Sub-Clause 12.2 below.

C. Preparation of Tenders

6. Documents comprising the Tender

6.1 The tender submitted by e-procurement by the Tenderer shall contain the document as following:

(a) The Tender (In the format indicated in Section 3);

(b) Scanned copy of Earnest Money Deposit;

(c) Priced Bill of Quantities

(d) Scanned copies of Qualification Information as per formats given in Section 3;

and any other materials required to be completed and submitted by tenderers in accordance with these instructions. **The documents listed under Sections 3, 5 and 8 shall be filled in without exception.**

7. Tender prices

7.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Tenderer.

7.2 The Tenderer shall fill in rates and prices and line item total (both in figures and words) for all Items of the Works described in the Bill of Quantities along with total tender price (both in figures and words).

Items for which no rate or price is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the bill of Quantities. Corrections, if any, shall be made by crossing out, initialing, dating and rewrite.

7.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer.

7.4 The rates and prices quoted by the Tenderer shall be fixed for the duration of the Contract and shall not be subject to adjustment on any account.

8. Tender validity

8.1 Tenders shall remain valid for a period not less than ninety days after the deadline date for tender submission specified in Clause 12. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.

8.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the tenderers may extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing or by cable. A tenderer may refuse the request without forfeiting his earnest money deposit. A tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause 9 in all respects.

9. Earnest money deposit

9.1 The Tenderer shall furnish, as part of his tender, earnest money deposit in the amount as shown in column 4 of the Table of IFT for this particular work. The EMD shall be submitted to the e-procurement portal on or before the time of submission mentioned in IFT. Photocopies of the documents should be not arised.

9.2 Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days **beyond** the validity of the tender.

9.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 9.1 and 9.2 above shall be rejected by the Employer as non-responsive.

9.4 The earnest money deposit of unsuccessful Tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 8.1.

9.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security.

9.6 The earnest money deposit may be forfeited:

(a) If the Tenderer withdraws the Tender after tender opening during the period of tender validity;
(b) If the Tenderer does not accept the correction of the Tender Price, pursuant to Clause 19; or
(c) In the case of a successful Tenderer, if the Tenderer fails within the specified time limit to
(i) Sign the Agreement; or
(ii) Furnish the required Security deposit

10. Format and signing of Tender

10.1 The completed bid comprising of documents indicated in ITB 12, should be uploaded by accessing **Karnataka Government** website http://kppp.karnataka.gov.in through **e-procurement**" along with scanned copies of requisite certificates those are mentioned in different sections in the bid document and scanned copy of Bid Security/EMD in case it s provided in the form OTC, NEFT, Debit Card & Credit Card.

10.2 All the documents should be uploaded to the e-procurement portal. Tenderer should take a print out of the declaration letter provided in the website on company letterhead and should sign, stamp and upload the same e-portal.

10.3 The tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Tenderer, in which case such corrections shall be initialed by the person signing the Tender.

D. Submission of Tenders

11. Up-loading and Submission of Tenders

11.1 The Tenders should be uploaded only through e-procurement portal. Tender should contain

A. Technical tender consisting of following:

a. All the Documents with required details in prescribed format: those are mentioned in different sections in the Tender. Form of Tender, Declaration statement regarding customs/excise duty exemption for materials/construction equipment brought to site as mentioned in section 2, etc., shall be downloaded, filled with required details, signed, scanned & uploaded to the e-procurement website http://kppp.karnataka.gov.in on or before the time and date indicated in notification/section I IFT.

b. **Tender Security**: Tender security can be paid in the form of OTC, NEFT, DEBIT CARD, and CREDIT CARD

The above documents along with notarized copies of documentary evidences as indicated in Section-II ITT, Section – II Qualification information & Section IV Forms of Tender shall be scanned and uploaded to the website compulsorily, failing which tender will be rejected in view of incomplete bid documents.

B. **Financial Tender consisting of Bill of Quantities:**

The Tender shall down load the bill of quantities and key in the rates (in figures only) in the Bill of Quantities sheet and upload the same file on to the website on or before the time and date indicated in notification /section – I IFT.

Note:

1. URL of the website for tender submission through e-portal http://kppp.karnataka.gov.in
2. The details related to submission of tenders, downloading/uploading of documents or other details are available in the help wizard, Vendor manual & FAQ of above website. The same is provided along with sample formats in Annexure-I of the Bid document for ready reference.

12. Deadline for submission of the Tenders

12.1 Tenders must be received by the Employer at the address specified above not **later than 16:00 hrs on .** In the event of the specified date for the submission of tenders being declared a holiday for the Employer, the tenders will be received up to the appointed time on the next working day**.**

12.2 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 5, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will then be subject to the new deadline.

13. Late Tenders

13.1 Any Tender received by the Employer after the deadline prescribed in Clause 12 will be returned unopened to the tender.

14. Modifications and Withdrawal of Tenders

14.1 Tenderers may modify and withdraw their tenders multiple numbers of times, until the deadline for submission of tenders by operating the relevant provision made in e-procurement. If the tenderer withdraws the tender before the deadline for submission of tenders and later if he is interested to submit the tender once again, may do so within the stipulated date & time as mentioned in Clause 12. In this case within the stipulated date and time, the tenderer can once again submit the requisition to the officer inviting tenders for access to withdrawn tender document for resubmission. For this tenderer need not make any additional payment towards the cost of tender document. Communication of modification/withdrawal by other means will not be accepted.

14.2 Deleted

14.3 No tender may be modified after the deadline for submission of tenders.

14.4 Withdrawal or modification of a tender between the deadline for submission of tenders and the expiration of the original period of tender validity specified in Clause 8.1 above or as extended pursuant to Clause 8.2 may result in the forfeiture of the earnest money deposit pursuant to clause 9.

14.5 Tenders may only offer discounts for individual items by simply modifying the quoted unit price in the Bill of Quantities. Also, Tenderer may enter their overall discount, at specified location in the Bill of Quantities only, by submitting tender modifications in accordance with this clause. Communication of discount by other means will not be accepted.

E. Tender opening and evaluation

15. Tender Opening:

15.1 The Employer will open all the tenders received (except those received late), including modifications made pursuant to Clause 14, in the present of the

Tenderers or their representatives who choose to attend at Date and time specified in Clause 12. In the event of the specified date of tender opening being declared a holiday for the employer, the tenders will be opened at the appointed time and location on the next working day.

15.2 WITHDRAWAL proposal submitted pursuant to clause 14 shall be read out first and their bids shall not be opened.

15.3 The tenderers names, the tender prices, the total amount of each tender, any discounts, Tender modifications and withdrawals, the presence or absence of earnest money deposit (amount, format and validity) the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the employer at the opening. No tender shall be rejected at tender opening except for the late Tenders pursuant to Clause 13. Tenders (and modifications) sent pursuant to Clause 14 that are not opened and read out at Tender opening will not be considered for further evaluation regardless of circumstances.

15.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 15.3.

16. Process to be confidential

16.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

17. Clarification of Tenders

17.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 19.

17.2 Subject to sub-clause 17.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, it should do so in writing.

17.3 Any effort by the Tenderer to influence the Employer in the Employer’s Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers’ Tender.

18. Examination of Tenders and determination of responsiveness

18.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender (a) meets the eligibility criteria defined in Clause 2; (b) has been properly signed; (c) is accompanied by the required earnest money deposit and; (d) is substantially responsive to the requirements of the Tender documents.

18.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderers obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

18.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

19. Correction of errors

19.1 Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

a. where there is a discrepancy between the rates in figures and in words, the lower of the two will govern 17: and

b. where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

19.2 The amount stated in the tender will be adjusted by the employer in accordance with the above procedure for the correction of errors and, with the concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount the tender will be rejected, and the earnest money deposit may be forfeited in accordance with sub-clause 9.6 (b).

20. Evaluation and comparison of Tenders

20.1 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with clause 18.

20.2 In evaluating the tenders, the employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:

a. Making any correction for errors pursuant to clause 19; and

b. Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with sub clause 14.5

20.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors, which are in excess of the requirements of the tender documents or otherwise result in unsolicited benefits for the employer shall not be taken into account in tender evaluation.

F. Award of Contract

21. Award criteria

21.1 Subject to Clause 23, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisions of Clause 3.

22. Employer's right to accept any Tender and to reject any or all Tenders

22.1 Notwithstanding Clause 21, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

23. Notification of award and signing of Agreement

23.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

23.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 24.

23.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

23.4 Upon the furnishing by the successful Tenderer of the Security deposit, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

24. Security deposit

24.1 Within 20 days of receipt of the Letter of Acceptance, the successful bidder would be required to give **performance bank guarantee of 5%** of the contract price plus **additional security for unbalanced bid amount from a Nationalized / Scheduled Indian Bank,** with jurisdiction at Bangalore

as specified, towards guarantee for completion of work within the stipulated period

- Banker's Cheque/Demand draft, /Pay Order in favour of **The Chairman, BWSSB payable at Bangalore**

***Modified clauses applicable only if the work is allocated for the reserved category security deposit for an amount equivalent to 5% of the contract price shall be deducted in every running bill. However, in case of first and final bill the entire security deposit will be deducted from the final bill.

24.2 The security deposit if furnished in cash or demand draft can, if requested, be converted to interest bearing securities at the cost of the contractor.

24.3 Failure of the successful Tenderer to comply with the requirements of Sub-Clause 24.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the earnest money deposit.

25. Corrupt or Fraudulent practices

25.1 The GOK requires that the Tenderers/Suppliers/Contractors, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, GOK.

(a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GOK contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GOK contract.

25.2 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 43.2 of the Conditions of Contract.

Executive Engineer

(UFW)-2 Division

SECTION 3:

FORMS OF TENDER, AND QUALIFICATION INFORMATION

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Form of Tender

[Tenderer shall down load this page, print on the letter head, fill the gaps, put the signature, scan the sheet and upload to the web site. Failing which tender will be treated as non-responsive.]

Description of the Works: "Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations under the jurisdiction of AEE E-1-2 sub division coming under AEE (UFW)-2 subdivision".

To,

Executive Engineer (UFW)-2 Division
18th cross, Margosa road,
Malleswaram, Bangalore.

Sir,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying this Tender for the Contract Price of _____(In figures) (_____) (In letters).

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tenderer documents.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,

Authorize Signature:_____

Name & Title of Signatory:_____

Name of Tenderer:_____

Address:_____

_____

To be filled in by the Tenderer, together with is particulars and date of submission at the bottom of the Form of Tender.

Qualification Information

The Following form is to be downloaded, particulars are to be filled, scanned and uploaded by the Bidder, to **website:** http://kppp.karnataka.gov.in along with the Bid.

Note: The detailed procedure for downloading/uploading the documents will be available in Help Wizard, Vendor manual & FAQ of the above mentioned website.

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 3 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1 Constitution or legal status of Tenderer [Attach copy] (Attach Copy)

Place of Registration _____

(Attach Copy)

Principal place of business: _____

1.2 Total value of electrical and mechanical engineering 2018–19_____

Works executed and payments received in the 2019 – 20_____

last five years (in Rs. Lakhs)[1] 2020 - 21_____

2021 - 22_____

2022 - 23_____

1.3 Work performed as Prime Contractor (in the same name) on works of similar nature over during the five years specified in 1.2 above.

Project Name	Name of the Employer	Description of Work	Contract Number	Value of Contract Rs. In Lakhs	Date of issue of Work Order	Specified Period of Completion	Actual Date of Completion	Remarks explaining reasons for delay in completion of work
1	2	3	4	5	6	7	8	9

[1] Attach Certificate from Chartered Accountant

1.4. Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A) Existing commitments and on-going works:

Description of work	Place & State	Contract No. & Date	Name & Address of Employer	Value of Contract (Rs. Lakhs)	Stipulated period Completion	Value of Works remaining to be complete (Rs. Lakhs)	Anticipated Date of Completion
1	2	3	4	5	6	7	8

(B) <u>Works for which Tenders already submitted:</u>

Description of work	Place & State	Name & Address of Employer	Estimated Value of Works (Rs. Lakhs)	Stipulated Date period of Completion	Date When decision is expected	Remarks if any
1	2	3	4	5	6	7

1.5 The following items of equipment are considered essential for successfully carrying out the works. The tenderer should furnish all the information listed below.

Item of Equipment	Requirement	Owned and available stipulated date period of completion when decision is expected					Remarks.
1	No.	Capacity	Owned	Number/ Capacity	Age/Condition		

1.6 Reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the last five years;

1.7 Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.

1.8 Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.

1.9 Proposals for subcontracting components of works amounting to more than 20% of the contract price (for each, the qualification and experience of the identified sub-contractor in the relevant field should be attached).

Letter of Acceptance

To:_____

–

(Name and Address of the Contractor)

Dear Sirs,

This is to notify you that your Tender dated_____for execution of the _____(name of the contract and identification number, as given in the instructions to Tenderers) for the Contract Price of Rupees_____(_____) (amount in works and figures), as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by your Agency.

You are hereby requested to furnish Security deposit, in the form detailed in Para 24.1 of ITT for an amount of Rs……within 20 days of the receipt of this letter of acceptance valid upto 30 days from the date of expiry of Defects Liability Period i.e. upto……and sign the contract, failing which action as stated in Para 24.3 of ITT will be taken.

Yours faithfully,

Authorized Signature

Name and Title of Signatory
Name of the Agency.

`

……

Issue of Notice to proceed with the work

To

_____(name and address of the Contractor)

Dear Sirs:

Pursuant to your furnishing the requisite security deposit as stipulated in ITT Clause 25.1 and signing of the contract agreement for the construction of ----------(Name of the Contract) a Tender Price of Rs……., you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

This agreement, made the _____day of _____20_____, between_____ _ [name and address of Employer] (hereinafter called “the Employer”) of the one part and _____ _____[name and address of contractor] (hereinafter called “the Contractor”) of the other part.

Whereas the Employer is desirous that the Contractor execute _____ _____ [name and identification number of Contract] (hereinafter called “the Works”) and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.

2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.

3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:

   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Tender;
   iv) Contract Data;
   v) Conditions of contract (including Special Conditions of Contract);
   vi) Specifications;
   vii) Drawings;
   viii) Bill of Quantities; and
   ix) Any other document listed in the Contract Data as forming part of the contract.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of _____
was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said _____
_____

in the presence of:

Binding Signature of Employer _____
_____

Binding Signature of Contractor _____

Executive

Engineer

(UFW)-2 Division

SECTION 4: CONDITIONS OF CONTRACT

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Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.

Compensation events are those defined in Clause 38 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause38.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance, notice to proceed with the works
(3) Contractor’s Tender
(4) Contract Data
(5) Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and

(9) any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7.1 deleted

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor’s staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer’s and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer’s risks, and the Contractor carries the risks which this Contract states are Contractor’s risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are

(a) in so far as rebellion, riot commotion or disorder or

(b) a cause due solely to the design of the Works, other than the Contractor’s design.

(C) Any Operation of the forces of nature (in so far as it occurs on the site) which an experienced contractor:

i. Could not have reasonably foreseen; or
ii. Could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:

a. Prevent loss or damage to physical property from occurring by taking appropriates measures or
b. Insure against such loss or damage

12. Contractor’s risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Queries about the Contract Data

13.1 The Employer will clarify queries on the Contract Data.

14. Contractor to construct the Works

14.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

15. The Works to be completed by the Intended Completion Date

15.1 The Contractor may commence execution of the Works on the Start Date and complete them by the Intended Completion Date.

16. Safety

16.1 The Contractor shall be responsible for the safety of all activities on the Site.

17. Discoveries

17.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

18. Possession of the Site

18.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

19. Access to the Site

19.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured/fabricated/assembled for the works.

20. Instructions.

20.1 The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

B. Time Control

21. Program.

21.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangement, order, and timing for all the activities in the Works.

21.2. The Employer’s approval of the Program shall not alter the Contractor’s obligations. The Contractor may revise the Program and submit it to the Employer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

22. Extension of the Intended Completion Date

22.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which make it impossible for Completion to be achieved by the Intended Completion Date.

22.2 The Employer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

23. Delays ordered by the Employer

23.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

24. Management meetings.

24.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.

24.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. Quality Control

25. Identifying defects:

25.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect.

26. Tests

26.1 The Employer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

27. Correction of defects

27.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for a long as Defects remain to be corrected.

27.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer's notice.

28. Uncorrected defects

28.1 If the Contractor has not corrected a Defect within the time specified in the Employer's notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. Cost Control

29. Bill of Quantities (BOQ)

29.1 The BOQ shall contain items for the construction, installation, testing, and commissioning work to be done by the Contractor.

29.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the BOQ for each item.

30. Variations

30.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him.

(a) Increase or decrease of any item of work included in the Bill of Quantities (BOQ):

(b) Omit any item of work:

(c) Change the character or quality or kind of any item of work

(d) Change the levels, lines, positions and dimensions of any part of the work:

(e) Execute additional items of work of any kind necessary for the completion of the works; and

(f) Change in any specified sequence, methods or timing of construction of any part of the work.

30.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract**.**

30.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing

in the BOQ so long as the work executed conforms to the approved drawing.

30.4 The Contractor shall promptly request in writing the Employer to confirm verbal orders and if no such confirmation is received within 15 days of request, it shall be deemed to be an order in writing by the Employer.

31. Payments for Variations

31.1 Payment for increase in the quantities of an item in the BOQ up to 25% of that provided in the Bill of Quantities shall be made at the rates quoted by the Contractor.

31.2 For quantities in excess of 125% of the tendered quantity of an items given in the BOQ the Contractor shall be paid at the rate entered in or derived from in the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract.

31.3 If there is no rate for the additional, substituted or altered item of the work in the BOQ, efforts would be made to derive the rates from those given in the BOQ or the Schedule of Rates (Applicable for the area of the work and current at the time of award of contract) and if found feasible the payment would be made at the derived rates for the item plus or minus the overall percentage of the original tendered rates over the current Schedule of Rat6es prevalent at the time of award of contract.

31.4 If the rates for additional, substituted or altered item of work cannot be determined either as at 31.1 or 31.2 or 31.3 above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.

31.5 If the Contractor’s quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer’s own forecast of the effects of the Variation on the Contractor’s costs.

31.6 If the Employer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

31.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

32. Submission of bills for payment

32.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously.

32.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items in the BOQ completed and (ii) valuation of Variations and Compensation Events.

32.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

33. Payments

33.1 Payments shall be adjusted for deductions for retention, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the within 60 days of submission of bill.

33.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

34. Compensation events

34.1 The following are Compensation event unless they are caused by the Contractor:

(a). The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.

(b) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.

© The Employer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.

(d) The Employer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(e) The effect on the Contractor of any of the Employer's Risks.

(f) The Employer unreasonably, delays issuing a Certificate of Completion.

(g) Other Compensation Event listed in the Contract Data or mentioned in the Contract.

34.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

34.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer's own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

34.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interest is adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

35. Tax

35.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

36. Liquidated damages

36.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Dates later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor; Payment of liquidated damages does not affect the Contractor's liabilities.

36.2 If the Intended Completion Dates extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

37. Cost of repairs

37.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor’s cost if the loss or damage arises from the Contractor’s acts or omissions.

E. Finishing the Contract

38. Completion

38.1 The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

39. Taking over

39.1 The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

40. Final account

40.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contact before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete, If it is not, the Employer shall issue within 90 days a Schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor's revised account.

41. As built drawings

41.1 If "as built" Drawings are required, the Contactor shall supply them by the dates stated in the Contract Data.

41.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer's approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

42. Termination

42.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

42.2 Fundamental breaches of Contract include, but shall not be limited to the following:

a) The Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer.

b) The Employer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 60 days.

c) The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation:

d) A payment due to the Contractor is not paid by the Employer within 90 days of the date of the submission of the Bill by Contractor:

e) The Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;

f) The Contractor does not maintain a security which is required:

g) The Contractor has delayed the completion of works by the number o days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

h) If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.

For the purpose of this paragraph: “corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. “Fraudulent practice” means a misrepresentation of acts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition”.

42.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub-Clause 42.3 above, the Employer shall decide whether the breach is fundamental or not.

42.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

42.5 If the Contract is terminated the Contractor shall stop work immediately, take the Site safe and secure and leave the Site as soon as reasonably possible.

43. Payment upon Termination

43.1 If the Contract is terminated because of a fundamental breach of contract by the Contractor, the Employer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

43.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare ill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and Contractor's costs of protecting and securing the Works and less advance payments received upto the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

44. Property.

44.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.

45. Release from performance

45.1 If the Contractor is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. Special Conditions of Contract

1. Labour:

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment. Housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the

several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require.

2. Compliance with labour regulations:

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amount as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

3. Protection of Environment:

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Executive Engineer

SECTION 5: CONTRACT DATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:

The Employer is : Executive Engineer, (UFW)-2 Division.
Address : BWSSB, 18th cross, Margosa Road,
Malleshwaram, Bangalore-560012.

Name of authorized Representative: Assistant Executive Engineer, (UFW)-2,
Suvarna bhavana, Malleshwaram,
Bangalore.

The name of the Contract and identification number of the contract is: "Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations under the jurisdiction of AEE E-1-2 sub division coming under AEE (UFW)-2 subdivision".

The Works consist of: Work of supply, installation & commissioning of 100mm dia Bulk Flow meters in various locations.

The start date shall be the date of issue of notice to proceed with the work

The Intended Completion Date for the whole of the Works is 5 Months

The following documents also form part of the Contract:

The Site Possession Date is: 15 days from date of issue of notice to proceed with the work.
The Site is located at: Various location of East Bangalore.

Payment - Terms.

The employer will make the payment to the items on the following terms-(Clause 43 GCC)

S. No.	Milestones	% of the Price
1	Upon Supply of Electro Magnetic Bulk Flow Meters at t each location.	50% of agreed price
2	Upon Installation, successful Testing and Commissioning of Electro Magnetic Bulk flow meters and synchronizing readings from all bulk flow meters to available central server.	45% of agreed price
34	Upon successful completion of 1 year Defect Liability Period.	5 % of agreed price (else BG of the same shall be submiited)
	Total	**100**

Insurance shall be provided for all the Bulk Flow meters

The Defects Liability Period is 365 days

The liquidated damages for the whole of the works are Rs.0.1% per days/delay

The maximum amount of liquidated damages for the whole of the work is ten percent of final contract price.

The following events shall also be fundamental breach of the contract:

1. The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.

The percentage to apply to the value of the work not completed representing the
Employer’s additional cost for completing the works shall be 30 percent.

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Executive Engineer

(UFW)-2 Division

SECTION 6: SPECIFICATIONS

GENERAL MECHANICAL, ELECTRICAL & INSTRUMENTATION WORKS

6.A.1 Applicable Codes and Specifications

The following codes and standards are included in this section.

IS:2060 - Specification for MS plate/HR coil to Manufacture MS pipes
IP 68 - Meter protection
Hard Rubber/EPDM/NBR - flow meter liner material with WRAS approval for domestic drinking water purpose
MS/CS/SS with corrosion resistant coating with min Corrosivity category of C4 - The coil housing
SS316/Hastelloy C - The electrode material
Data logger - logging data as daily, weekly, or monthly basis
ISI 865GR5001B5970-431 5- 29 - Specification for cast iron butterfly valve/ sluice valve
IS :14846 : Speciation for dimensions of valves, bolts and nuts, hand wheels
BS 5150 and IS 780. Specification for Size of valves and pressure rating test certificates for
Materials, strength and leakage
IS 3589-2001 **:** Specification for MS pipe
ISS 1554 : specification for Cable suitable for 3 phase, 50 Hz
ISS 1554 : speciation for routine test of the standard conductor
PVC armoured cable
IE Rule : for earthing of transformer yard and pump house
IS 2713 – 7 : The tabular pole shall be erected in the cement concrete work (shall be erected in the cement concrete work 1:2:4) including excavation and refilling of planting depth of the pole to the ground level and the coping CC shall be upto 0.6mt above ground level

ISO 7005, IS 6392 or BS 4504 - .Specification for Flanges shall be machined faces and edges with PN 1.6 rating
IS 5660. : Specification for all exposed machined ferrous surfaces shall be painted with one coat of aluminum red oxide primer
IS 341 – Type-B : Specification for Two coats of black Japan paint
IS 9862 or IS 2932 : specification for paints
IS 210 Gr FG 200/IS 1030 - Specification for sluice valve material construction of Body and gate shall be Grey cast Iron / CS
BS 970 Gr 431 S29./IS 1030 Specification for sluice valve material construction of Spindle shall be: Stainless steel /CS
ASTMA 743 CF8 or Alloy SteelS3444 - Specification for sluice valve material construction of Seat
Rings shall be Stainless steel

IS 318 Gr LTB2 - Specification for sluice valve material construction of Back seat
Bush shall be Bronze

IS 14846 - Specification for By pass arrangements of Sluice valve

Fire Protection - As per IE rules

IS: 7322-1985 - Specification for MS Dismantling Joint, Bends , Flanged

pipes and MS pipes of manufacturing, providing , transportation etc.,

IS: 3589- 2001 - Specification for Hydraulic test , pressure test, working

Pressure both at factory and site for MS specials

IS: 9103-1999 - Specification for concrete add mixtures

Executive Engineer

(UFW)-2 Division

TECHNICAL SPECIFICATIONS

I GENERAL

1.1 Scope of Work.

The scope of work under this Contract includes the following:

1.1.1 NA

1.1.2 Earthwork in all kinds of soil, hard rock. The pipeline is to be laid in the developed city roads with traffic

1.1.3 NA

1.1.4 Backfilling the trenches, restoring and making good all surfaces which are damaged during excavation.

1.1.5 Dismantling and reconstruction of structures such as culverts, storm water drains, roads etc., and utility lines such as water supply pipe lines, sewer lines coming in the way of the pipeline alignment.

1.1.6 Testing and commissioning of the pipe line after laying.

1.1.7 Maintenance of all the pipelines for 12 months after commissioning. During this period, the contractor has to set right the defect of any kind in the manufacture, laying and jointing of all the pipelines and in the other works in this scope of tender.

1.1.8 All work shall be done as per the specifications. The works shall include providing all materials, equipments, labour, tools, plants, transport etc., and all other services necessary for the complete construction including necessary sub-soil investigations.

1.1.9 The alignment of the pipeline and other typical details of pipe bedding, valve chambers, thrust blocks, pipe supports, and the general arrangement of reservoir are furnished in Drawings. Further details shall be furnished in the construction drawings during the construction stage if found necessary.

1.2 Royalties

1.2.1 The Employer shall deduct Royalties on materials used in the Works from the progress payments to the Contractor at the rates specified in the most recent “Amendment to the Karnataka Minor Minerals Concession Rules - 1969” as published by the Commerce and Industries Department (Mines) and as illustrated in Annexure-1, attached.

1.3 Site Order Book

1.3.1 The Contractor shall maintain an identical pair of Site Order Books (one marked original and the other marked duplicate), at the Site at all times during the execution of the Works for the use of the Engineer and the Contractor. All instructions issued by the Engineer to the Contractor shall be recorded in both sets of the Site Order Book and shall be signed by the issuer and countersigned by the Contractor. After compliance with the instruction, the Contractor shall record the same in both sets of the Site Order Book duly signed and countersigned by the Engineer. Acceptance of any part of the work executed by the Contractor shall be subject to verification with respect to compliance of respective instructions of the Engineer through the Site Order Book. The

Engineer shall retain the original copy of the Site Order Book, while the Contractor shall retain the duplicate one.

1.4 Quarry Materials

1.4.1 The Contractor shall be wholly responsible to identify the suitable sources for quarry materials required for the Works, such as earth, sand, stone, muram, etc., and to make his own arrangements for collection and transportation of the materials irrespective of the leads and lifts required. The quarry thus identified by the Contractor should have proper license from the Government of Karnataka. All materials supplied by the Contractor shall satisfy the requirements set forth in the Specifications and shall be subject to the approval of the Engineer. The Contractor shall take this into account while offering his rates and no claims whatsoever shall be entertained for extra costs on this account.

1.5 Inspection and testing

1.5.1 Inspection of Material to be procured

Inspection and certification of all materials used on the works such as MS Plates / Pipes and Specials , Valves, Cement, Size Stones, Sand aggregate, Lead, Rubber gaskets etc., for conformity with specifications of BIS. If insisted, inspection of materials at the manufacture place shall be arranged by the contractor at his cost including the travelling and accommodation of the inspecting officer.

1.5.2 **Inspection and certification of the various components of works.**

Construction of MS pipeline with all fixtures, construction of Valve Chamber including back filling of trench in layers with compaction as specified to ensure that all components of works are carried out as per specification and to required standards.

Inspection & Certification of Hydraulic Test on Completed pipe line in reaches as specified.

1.6 Technical Specifications

1.6.1 Engineer shall have the right to modify/alter the Particular Specifications and/or Standard Specifications at any time which promise to confer equal or better quality than the standard specified in the tender document. Such modification or alteration shall be acceptable to the Contractor subject to no additional financial burden to either the Contractor or the Employer.

1.7 Storage of Materials and Plant

1.7.1 The Contractor shall provide appropriate storage facilities for materials like cement, steel, aggregates, consumable supplies, equipment, mechanical and electrical items, etc., and shall take all safety and security measures against theft and deterioration in quality, at his own cost.

1.8 Procurement of Materials:

1.8.1 CEMENT:

The Contractor shall use only 43 grade cement conforming to IS 8112 / 89 with latest amendments with ISI mark. The Contractor should furnish the manufacturer test certificate for the above brand of cement for having manufactured the cement as per relevant BIS and guarantee certificate before using the cement.

1.8.2 STEEL:

The Contractor shall procure the steel from VISL / SAIL / VSP / TISCO and manufacturers' test certificate is to be produced.

1.8.3. NA

1.9 Equivalency of Standards and be procured, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be acceptable subject to the Engineer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least 28 days prior to the date when the Contractor desires the Engineer's approval. In the event the Engineer determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards specified in the documents.

1.10 Sign Board

1.10.1 The Contractor shall provide a sign board at the site of the Works of approved size and design which provides (i) the name of the Project (ii) the names and addresses of the Employer, the Contractor and the Consultant; (iii) the name and short description of the Project, (iv) the amount of the Contract Price ; and (v) the starting and completion dates.

1.11 Samples and Tests

1.11.1 The Contractor shall be responsible to develop a quality control program and to provide all necessary materials, apparatus, instruments, equipment, facilities and qualified staff for sampling, testing and quality control of the materials and the works under the Contract. Without limiting the generality of the foregoing, the Contractor shall either (i) establish a testing laboratory at the site of Works which is adequately equipped and staffed to carry out all sampling and testing in accordance with the requirement set out in the General Specifications and/or these Special Specifications and provide all field equipment and apparatus as necessary to conduct all specified in-situ tests and/or any Tests on Completion, provided the correctness of the equipments are ensured or (ii) arrange for routine sampling, testing and reporting, as required, through a certified independent testing laboratory acceptable to the Engineer. All costs of such sampling, testing and reporting of test results will be borne by the Contractor, and the Contractor shall include sufficient provisions in his tendered rates to allow for independent sampling and laboratory testing under the direction of the Engineer up to 5% of the required tests at no additional cost. The Contractor shall furnish certified copies of all test reports to the Engineer within 3 days of completion of the specified tests.

1.11.2 The Contractor shall, within 14 days after the date of the Letter of Acceptance, submit to the Engineer for his consent a detailed description of the arrangements for conducting the quality control programme during execution of the Works, including details of his testing laboratory, equipment, staff and general procedures. If following submission, or at any time during the progress of Works, it appears to the Engineer that the Contractor's quality control programme is not adequate to ensure the quality of the Works, the Contractor shall produce a revised programme which will be adequate to ensure satisfactory quality control.

1.12 Protection of Utilities

1.12.1 The Contractor is required to carefully examine the location of the Works and their alignments and to make special enquiries with all authorities concerning all utility lines such as water, sewers, gas pipe, telephone (underground and/or overhead) lines, electric cable (underground and/or overhead) lines, etc.; and to determine and verify to his own satisfaction the character, sizes, position and lengths of such utilities from authentic records. The Contractor shall be wholly responsible for the protection and/or facilitating relocation of such utilities as may be required, and shall not make any claim for extra work or extra time that may be required to protect or facilitate relocating such utilities. If any major shifting or realignment of water, sewers, gas pipes, electric and telephone lines is necessary due to their interference with the proposed Works, the same may be done by the Employer. The cost of such relocation will be borne by the Employer. In case the alignment of the pipeline crosses high tension electrical transmission lines belonging to the Karnataka Power Transmission Corporation Ltd. (KPTCL) or other authorities, the Contractor shall take all precautions necessary to see that the work is carried out with care and safety, without disturbing such transmission lines. The Contractor will be responsible to carry out all construction activities in such reaches in consultation with the owners of such facilities. However, satisfactory completion of the entire work will be the responsibility of the Contractor.

II EARTH WORK:

2.1 GENERAL:

2.1.1 The earth work excavation for laying of pipe shall be carried out. The Contractor shall make all excavations required for laying and jointing of the pipeline and construction of pertinent structures as required in the project. Except where otherwise required by the project or instructed by the Engineer, all excavation shall be in open cut to the specified widths and depths. The Contractor is advised to satisfy himself with regard to the likely conditions that may be met with during the execution of the Works, with regard to the underground obstructions or conditions, necessary dewatering requirements etc. Before commencing the earth work, the Contractor shall carry out detailed survey of the proposed alignment, prepare construction drawings showing the longitudinal section of the ground profile, locations of valves and other appurtenances and submit to the Employer for approval.

2.2 CLASSIFICATION OF EXCAVATION

All materials involved in excavation shall be classified in three categories as follows:

2.2.1 **Ordinary soil:** This includes excavation in all types of soil including soil containing gravels, murums, loose boulders, viz., ordinary gravely soil, hard gravely soil, wet soil, stiff slushy soil, chettu soil and calcareous strata, but exclusive of disintegrated rock, soft rock/shale;

2.2.2 **Soil Containing Disintegrated Rock, Soft Rock and Soft Shale:** This category includes excavation in soil containing disintegrated rock, soft rock or soft shale which can be cut by shovel and no hand or mechanical chiseling is required.

2.2.3 **Medium Hard Rock:** This category includes excavation in lime stone, sand stone, hard shale and schist fissured rock, without resorting to blasting.

2.2.4 **Hard Rock:** This category includes excavation in hard rock requiring hand or mechanical chiseling or blasting. In case of difference in opinion between the classification of rock requiring blasting and that requiring chiseling, wedging, the site of work shall be inspected by the engineer and the decision of the Engineer shall be final and binding on the Contractor.

2.3 LIMITATION OF EXCAVATION

2.3.1 The trench for laying MS Spiral welded pipes shall have minimum width as per standards stipulated or as directed by the Engineer-in-charge. A minimum earth cover of 1.2 m shall be maintained above the pipe top, unless otherwise specified or shown in the alignment drawings.

2.3.2 The Contractor shall be responsible to ensure that the widths and depths of the trenches do not exceed the limits shown in the construction drawings. Should the excavation occur beyond the dimensions specified therein, because of the negligence of the Contractor, the Contractor shall fill the excess space with granular material or concrete as directed by the Engineer. Nothing extra shall be paid to the Contractor on account of this.

2.4 TRAIL PITS

2.4.1 Trial pits may be dug by the Contractor, without being directed to do so, along the alignment as shown on the drawings in advance of the excavations for the purpose of satisfying himself as to the location of under ground obstructions or soil conditions.

2.5 SLIPS AND SLIDES

2.5.1 The Contractor is responsible for proper protection of excavations made by him from any slips and slides. All slides and caving shall be handled, removed or corrected by the Contractor without any extra compensation at whatever time and under whatever circumstances they may occur. The excavations shall be made good and brought to necessary depth, width and levels without any extra cost.

2.6 STCKING OF EXCAVATED MATERIALS

2.6.1 The excavated material shall be stacked on the sides of the trench wherever possible. Wherever it is not possible to stock on the sides of the trench, contractor has to find the place nearby for stocking the excavated material and cart the materials to & fro. Rate for this shall be included in the earthwork itself and no extra rate will be paid for this.

2.6.2 Surplus earth is to be disposed off to a place identified by the contractor approved by the engineer. There is a item for this work and will be paid accordingly.

2.7 Safety measures

The Contractor shall provide adequate safety measures during excavation. They shall include:

1. Barricading all sides of the open trenches.
2. Red danger lights which can be easily visible from dusk to dawn placed at an interval of 20 m.
3. Traffic signals and display boards giving direction for diversion of traffic at the appropriate places as may be directed by the Engineer.
4. Adequate safe wooden plank / board or steel plate over the trenches to facilitate crossing by the public residing on either side of the trench.
5. Round the clock watch and ward maintaining all safety regulations at the site of work and protecting the site from unauthorised intrusions.

2.8 Progress of Excavation of pipe trenches

The Contractor shall adjust excavation of trenches in such lengths that the pipes can be laid in such exposed portion of the trench within 2 days.

2.9 Shoring and Bracing

The Contractor shall supply, fix and maintain necessary sheathing, shoring and bracing etc., in steel or wood, as may be required to support the sides of the excavation, to protect workmen in the trench and to prevent any trench movement which might any way injure or delay the work, change the required width of the trench, make unsafe condition for adjacent pavements, utilities, buildings or other structures above or below ground.

Sheathing, shoring and bracing shall be withdrawn and removed as the backfilling is being done, except when the Engineer may agree that such sheathing, shoring and bracing be left in place, at the Contractor’s request. In any case, the Contractor shall cut off any such sheathing at least 600 mm below the surface and shall remove the cut off material from the trench.

All sheathing, shoring and bracing which are left in place under the foregoing provisions shall be removed in a manner so as to not endanger the completed work or other structures, utilities or property, whether public or private.

2.10 EXCAVATION

2.10.1 Excavation in Rock

Excavation in rock shall be carried out to a depth, 150 mm more than the bottom level of pipe and to a width equal to the diameter of the pipe plus minimum working space on either side as given in drawing. Unless otherwise directed by the Engineer, rock excavation shall be progressed at least by 50 m in advance of the pipe length proposed to be laid.

2.10.3 Excavation for Valve Chambers and Other Appurtenant Structures

The Contractor shall excavate as required for all structures with foundations to firm, undisturbed earth up to the level of the under side of the structure. If the

excavation is in rock, the Contractor shall excavate all rock at least to the minimum limits shown on the standard details for trenches and to the grade of the bottom of inlets, junction chambers or other structures as required. Where the bottom of the structure is in rock, it should be ensured that no rock shall project above the lower surface of the concrete in such a manner so as to reduce the required thickness of concrete placed simultaneously as an integral part of the foundation and to the outside of structure foundation where structure is to be built. The Contractor shall excavate the trench / pit to provide necessary working space on all sides and for accommodating any sheathing, shoring or bracing etc.

2.11 Contractor's Responsibility

The Contractor shall be responsible for the adequate pumping, drainage and bailing out water from the excavated trench. In case of failure to make such provisions or any other provisions which may result in unsuitable sub-grade conditions, the Contractor shall replace and repair the sub-grade as directed to the satisfaction of the Engineer, at his own cost and responsibility.

Should the Contractor select to use a gravel sub-grade to facilitate flow of water to pumps or other points of disposal, such gravel sub-grade shall not be measured or paid for as an extra item.

2.12 Works Included in Excavation

The following works as per specifications are also included in excavation and the term 'Excavation' shall construe to mean all such items of work. The quoted rates should include the same:

1. Provision of side space or additional space in the trench/pit for working and/or accommodating sheathing, shoring, bracing, etc.
2. Supply, installation and removal after the work, all sheathing, shoring and bracing required to protect the excavation where required or where such work is recommended by the Engineer.
3. Protection of excavations.
4. Providing adequate safety measures.
5. Additional work in connection with overhead wires and poles.
6. Excavation for Socket hallows.
7. Supplying and fixing of sight rails and boning rods in the trench to facilitate measurement of work.

2.13 Measurement and Payment for Excavation

2.13.1 For Excavation

The measurement for excavation shall be considering the allowable widths, depths with allowed side slopes (if any) for different classes of soils as per approved classification. The measurement for excavation shall be based on "neat line" dimensions as specified in the drawing or Specifications, for different types of soils and depth of excavation. The total volume of excavation shall be computed as a square bottomed trench of width equal to the outer diameter of the pipe, with minimum working space as given in the drawing, added to it, length up to the length of the trench being measured. The depth of trench being average depth taken at 30 m intervals, between the level of bottom of trench and the original surface of the ground. The length of the trench shall be measured as per the actual length of pipes and fittings /

specials laid at work site. However depth shall be measured at closure intervals at vulnerable places. The volume of excavation for structures like valve chambers, thrust blocks and anchor blocks etc., shall be computed and measured for payment as per the bottom area of the particular structure on outer periphery multiplied by the average depth between the level of the finished bottom of the structure and the original surface of the ground. The quantity shall be measured in cubic meters correct to two decimal places. The method of measurement for excavation in different classes of soils shall be as follows:

2.13.2 In Ordinary Soil and Soil Mixed with Disintegrated Rock and Soft Rock / Shale

In this category of soils, the excavation quantity shall be computed as specified above.

2.13.3 In Hard rock

In case of hard rock requiring chipping or chiseling, measurements shall be taken prior to and after chiseling and the volume of rock excavation shall be measured based on this difference. The excavation in rock shall be paid on stack measurements with a deduction of 40% in volume for voids.

2.13.4 For Excavation in Combination of Ordinary Soil, Disintegrated Rock, Soft Rock/Shale and Hard Rock/Schist

Wherever the excavation is undertaken in combination of ordinary soil, disintegrated rock, soft rock /shale and hard rock, the hard rock part shall be measured and paid, the soil part shall be measured and paid for the total measurable excavated quantity deducting the quantity measured for the hard rock. The total computed volume of excavation shall be equal to the sum of the computed volumes for each category of excavation undertaken.

2.14 Protection of Utilities

The Contractor is required to carefully examine the location of the Works and their alignments and to make special enquiries with all authorities concerning all utility lines such as water, sewers, gas pipe, telephone (underground and/or overhead) lines, electric cable (underground and/or overhead) lines, etc.; and to determine and verify to his own satisfaction the character, sizes, position and lengths of such utilities from authentic records. The Contractor shall be wholly responsible for the protection and/or facilitating relocation of such utilities as may be required, and shall not make any claim for extra work or extra time that may be required to protect or facilitate relocating such utilities. If any major shifting or realignment of water, sewers, gas pipes, electric and telephone lines is necessary due to their interference with the proposed Works, the same may be done by the Employer. The cost of such relocation will be borne by the Employer.

In case the alignment of the pipeline crosses high tension electrical transmission lines belonging to the Karnataka Power Transmission Corporation Ltd. (KPTCL) or other authorities, the Contractor shall take all precautions necessary to see that the work is carried out with care and safety, without disturbing such transmission lines. The Contractor will be responsible to carry out all construction activities in such reaches in consultation with the owners of such facilities. However, satisfactory completion of the entire work will be the responsibility of the Contractor.

III BEDDING.

3.1. Bedding for the pipe

Bedding shall be provided all along the stretch of the pipe line, which differs based on the area through which the pipe line passes. However, the type of bedding to be provided shall be as decided by the Engineer.

3.2 Earth Bedding

The pipes shall be placed on the natural, undisturbed earth bedding, which has been carefully shaped to fit the lower part of the pipe for a width of at least 50 % of its external diameter. The trench shall be excavated to an extra breadth and depth, wherever weld joints are coming. Filling and removing earth or similar materials beneath the pipe to adjust with the grade will not be permitted except filling with compacted granular bedding material or murrum.

3.3 Gravel Bedding

Wherever rock is met with, it shall be removed up to 150 mm below the bottom level of the pipe to a minimum width equal to the width of the trench and the resulting space shall be filled up with good quality compacted gravel. The granular material shall be filled in the trench up to the level of ¼ the outer diameter of the pipe line, above the bottom of trench and well compacted. Unless otherwise directed by the Engineer, rock excavation shall progress at least 20 m in advance of the pipe length proposed to be laid.

3.4 Measurement for bedding:

The Contractor shall include the cost of earth bedding required for the pipeline in the tendered rate for pipe laying, for providing gravel bedding. The surplus quantity of excavated earth shall be disposed off. The quantity shall be measured in cubic meter correct to two decimal points.

IV BACK FILLING

4.1 General

The Contractor shall use selected surplus spoils from excavated materials for backfilling. All fill material shall be subject to Engineer’s approval. The excavated materials suitable for backfilling shall be stored not closer than 600 mm from the edge of the trench and shall not obstruct any public utilities or interfere with travel by local inhabitants or general public. Handling and storage of excavated materials must meet with the regulations of the Local Government Authorities. The detailed specifications for backfilling shall be as per Clause 8 of IS: 3114-1994 and Clause 4.11 of IS 12288-1987.

4.2 Method of Backfilling

Trenches and excavated pits for structures shall be backfilled to original ground level or to such other levels, as the Engineer may direct. All backfilling shall be carried out in orderly manner expeditiously and consistent with good workmanship.

4.2.1 Backfill material put into the trenches/pits for backfilling, shall unless otherwise specified be compacted and built up as to minimise future settlement as much as is reasonably possible. For this, care shall be exercised in selecting backfill

material free from large hard clay lumps, especially in cramped areas directly adjoining the walls of structures.

4.2.2 Backfilling in trenches shall be done as pipe laying progresses, with the permission of the Engineer, after the pipe or conduit is properly bedded, jointed and inspected and all measurements for the location of Y-Junctions, tees, etc., are properly recorded by the Engineer and sufficient time is allowed for the joint materials or cement concrete or mortar to set. However the joints shall be left open for inspection during testing, which shall be backfilled after successful completion of testing, after obtaining permission from the Engineer. Backfilling around and over the pipe, conduit, or structure shall be taken up uniformly on all sides and in the sequence and manner specified hereinafter, with care to avoid the displacement or damage to the pipe, conduit or structure. For the purpose of backfilling, the depth of trench shall be divided into the following three zones measured from bottom to top of trench, as follows:

i. Zone A : From bottom of trench to the centre line of pipe,
ii. Zone B : From the level of centre line of pipe to a level of 300 mm above the top of pipe,
iii. Zone C : From a level of 300 mm above the top of pipe to the top of trench.

4.2.3 Backfilling in the trenches and around structures shall be carried out in horizontal layers of uniform thickness of not more than 150 mm when measured loose. As may be necessary to attain maximum compaction, the backfill material shall be moistened by sprinkling with water. After placing each layer of backfill material, the layer shall be thoroughly and uniformly compacted by means of mechanical or hand tampers. The compacting equipment and the manner of its use shall be subject to the approval of the Engineer.

4.2.4 After the backfill material is placed in Zone A and Zone B as specified above, the remaining portion i.e., Zone C of the trench may be machine backfilled. Even in this case the backfill material shall be placed in uniform horizontal layers of not more than 150 mm thickness. Small pebbles of size less than 50 mm, if any, shall be so distributed throughout the mass, that all interstices are solidly filled with fine material. The backfill material shall be tamped with mechanical tamping equipment, after moistening the backfill by sprinkling with water to obtain maximum compaction (min 95% proctor density).

4.2.5 Machine backfill shall be so conducted that the material deposited in the trench shall not fall directly on top of the pipe from such a height as might result in damage to the pipe joints or alignment.

4.2.6 If the trench is subjected to conditions which might cause flotation of the pipe before sufficient backfill has been placed, the Contractor shall take the necessary precautions to prevent floatation of the pipe, conduit or structure.

4.2.7 Before final acceptance of the work, additional tamped earth shall be added to restore the settled trench surface to the required level of the adjacent earth surface or to the base of crushed rock wearing surface or to the finished earth base.

4.2.8 If from the excavated soil, enough backfill material is not available, imported, selected and approved backfill material from the borrow pits is required to be placed for backfill, on approval of the Engineer backfilling of trenches where

the excavation is in the rock shall be with the surplus soft soil, with all lead and lift.

4.3 Disposal of Surplus Excavated Material

The excavated material which is in surplus to the requirements after backfilling shall be removed and spread at places shown by the Engineer, with all lead and lift from the site of work, for which payment shall be made as per the quoted rates. No surplus or excess material shall be disposed in a stream / channel or in any place where the pre-construction surface drainage may have to be provided, without written permission of the Engineer.

V MILD STEEL PIPELINE

5.1 NA

5.2 NA

5.3 Materials

Steel plates – NA

Cement – Ordinary Portland cement conforming to IS 269.

Aggregate – The aggregate shall confirm to IS 383

Water – The water used in preparation of concrete mix shall conform to the requirements of mixing water specified in IS : 456

Welding consumables – such as electrodes, filler rods and wires shall conform to IS 814, IS 3613, IS 6419 and IS 7280

When requested by the Engineers, the contractor shall provide test sample of the materials to be used in the works for testing. The cost of such tests shall be borne by the contractor and shall be included in his item rates.

5.4 Inspection

All works and material under specification will be rigidly inspected during all phases of manufacture and testing and such inspection shall not relieve the contractor of his responsibility to furnish materials and performed work in accordance with this specification.

The contractor will notify the engineer, in advance of the procurement of materials and fabrication thereof, in order that the employer may arrange for mill and shop inspection. The engineer may reject any or all materials or work that does not meet with any of the requirements of this specification. The contractor shall rectify or replace such rejected material/performed work at his own cost, to the satisfaction of the engineer.

The Engineer shall have free access to those parts of all plants or any other premises and sites that are concerned with the furnishing of materials or the performance of the work under this specification.

The contractor shall supply free of cost required specimen of materials for testing by the employer at any time during the progress of work and shall bear the cost of all such tests or retests to the satisfaction of engineer.

The contractor shall provide 2(two) sets of accurate “GO” and ‘No Go’ ring gauges to measure the diameter of pipes, specials and fitting for the use of the Engineer at no extra cost.

5.5 Manufactures of Pipes and Special

5.6 5.5.1 General

The pipes shall be truly cylindrical, and straight in axis. The ends shall be accurately cut and prepared for field welding the external circumference of the pipe pieces which are to be fixed adjacent to the flange adapter with fixed outer diameter shall not deviate from theoretical one by more than 2mm. to obtain this accuracy the pipe shall be rolled several times, if necessary, as pipe pieces should be truly cylindrical. The external longitudinal welding of this pipe shall be ground smooth flush with surface to the satisfaction of the Engineer, for a length of 200 mm from the ends of the pipe. No extra cost shall be charged by the contractor for this grinding work.

Minor repair by welding or otherwise shall be permitted at the discretion of the engineer, but such repairs shall be done only after obtaining the prior permission from the Engineer. Any pipe or part thereof, which develops injurious defects during welding or other operations, shall be rejected.

5.5.2 Fabrication Yard - NA

5.5.3 Demonstration -

The works under demonstration shall include but not limited to the following:

- Flow testing

5.5.4 NA

5.5.5 NA

5.5.6 NA

5.5.7 NA.

5.5.8 NA

5.5.9 NA

5.5.10 NA

5.5.11 NA

5.5.12 NA

5.5.13 NA

5.5.14 NA

5.5.15 NA

5.5.16 NA

5.6 NA

5.7 NA

5.8 NA

5.9 NA

5.9.1 General- NA

5.9.2 Laying Programme-NA

5.9.3 NA

5.10 External Coating with Corrosion resistant tapes

NA

5.10.1 NA

5.10.2 NA

6.10.3 NA

6.10.4 NA

6.11 Buried Pipelines

6.11.1 NA

5.11.2 NA

5.11.3 NA

5.11.4 Pipe Laying

Pipe shall be laid in accordance with IS 5822 unless otherwise specified herein.

The pipeline shall be constructed in lengths with a separate full time gang working on each length. The work on lengths may proceed concurrently. The programme for pipe laying shall be submitted to and be approved by the Engineer at the start of the contract. Any subsequent changes to the programme shall be submitted and approved by the Engineer before work to a different programme is started.. excavation for the pipeline in any one length shall not at any time proceed more than 2 km beyond the end of a hydraulically tested, completed and backfilled length of pipe, unless otherwise

approved by the Engineer. The exposed joints between tested sections shall be disregarded in the above definition.

No metal tools or heavy objects shall be permitted to come into contact with the pipes or fittings. External coated pipe shall be handled at all times with wide non- abrasive canvas, rubber or leather straps or other equipment to prevent damage to the coating. The use of chains, wire slings, or any other handling equipment found to be injurious to the coating shall not be permitted. The timber or skids used to support the coated pipe prior to lowering into the trench shall not be properly padded with sufficient bags stuffed with sand or straw for protecting the coating. Alternatively, the pipe may be supported alongside the trench on mounds of sand. Any injury to the protective coating from any cause must be repaired before the pipes or fittings placed in the trench. During laying operations, no debris, tools cloth or other material shall be placed in the pipe. Pipes and fittings shall be lowered into the trench with equipment suitable for the weight of the pipes and fittings, and they shall be carefully cleaned before jointing.

Pipe shall be laid accurately to the lines and levels shown on the Drawings, within a tolerance of +- 10 mm.

Pipe alignments shall be straight between bends or curves. Length laid to curves shall only be allowed where shown on Drawings or in accordance with detailed proposals approved by the Engineers.

Properly painted sight rails shall be supplied and erected, with boning rods of predetermined measurement for the boning of individual pipes to the correct gradient. The sight rails shall be situated vertically above the line of the pipe or immediately adjacent thereto, and there shall at no time be less than three sight rails in the position on each length of the pipe under construction to any one gradient.

The contractor may submit to the Engineer for his approval an alternative method of the control of pipe laying to the correct levels and alignment.

The joining of pipes shall be made in accordance with the\e requirements of this specification. The Contractor shall obtain from manufactures all special information regarding the handling of the pipes, joints, and other fittings and he will be deemed to have made him thoroughly conversant with all phases of pipe laying before commencing the works.

A “badger” or “bung” about 10mm smaller than the internal diameter of the pipe shall be kept in the pipe at all times, pulled forward as the work progress. When pipe laying is not in progress, including overnight, the open ends of the pipeline shall be blanked off with a temporary watertight fitting approved by the Engineer. The pipe shall be suitably held down so that the pipe does not become buoyant in the event of the trench becoming flooded.

To restrict the flow of rain runoff along the trench the contractor shall be plug the trench with backfill material at distances not exceeding 250 m until the pipeline can be filled in. the plugs shall be removed when trench filling is

taking place. In granular bedding areas the plugs shall be of clay and shall be left in.

5.11.5 Level Control

The criterion for the level to which transmission main shall be laid such that the cover above the crown of the pipe to ground level shall be as specified in the drawings but in no case shall be less than 1200 mm unless otherwise directed by the Engineer.

5.11.6 Laying to Curves

Where pipes are to be laid to curves, the deflection at each joint shall not exceed one degree. For sharper curves specifically made bends shall be provided.

5.11.7 Lowering and Jointing

The pipe shall be lowered into the trenches such that no part of any shoring is disturbed or damaged and if necessary, additional temporary struts may be fixed during the lowering operations. Care shall be taken to ensure that the longitudinal joints of two consecutive pipes at each circumferential joint are staggered by 90 degree. While assembling the pipes, the ends shall have to be brought close enough to leave a uniform gap not exceeding 4 mm. there shall be no lateral displacement between the pipe faces to be joined. If necessary, spiders from inside and tightening rings from outside or other suitable equipment shall be used to bring the two ends in perfect contact and alignment. In no case shall hammering or longitudinal slitting be permitted. Jacking may be permitted for this purpose in particular circumstances and approval by the Engineer.

When the pipe is properly assembled firmly supported on wooden beams and wedges or by other approved means it shall be checked for correct line and level and tack welded. The tack welded circumferential joints shall then be welded fully.

On completion of the pipe jointing the external portion shall be coated with M15 concrete and the trench and the welding pits shall be cleaned. The welding pit shall be filled with approved bedding.

5.11.8 Floatation

The contractor shall take proper precautions against the risks of floatation and the flooding of the excavated works and shall make due allowances in his programme for any closure he considers necessary on account of monsoon.

Should any section of the pipeline be affected by floating in the course of works the entire work shall be removed and then reinstalled to the satisfaction

of Engineer. The entire cost of laying it again to the correct line and level shall be to account of the Contractor.

5.11.9 Steel Props

In order to effectively provide cement mortar lining to the inside of the pipes and to avoid difficulties during the work, it is necessary that the roundness of the pipes is maintained circular till the lining work is taken up. To achieve the same, steel adjustable screw type props of screw or similar approved type consisting of minimum six legs(three props) shall be fixed inside the pipe and the diameter correctly set.

The design and drawings of the props that the contractor intends to use should be approved by the Engineer before starting the work. These props shall be fixed vertically at intervals as directed by the Engineer. The props should be kept in position at least for three days after the encasing of the pipe in that section is completed or until refilling is done to the full height of fill over the pipe in case the pipes are not encased. The props shall be removed only after obtaining permission from the Engineer.

5.12 Internal Cement Mortar Lining

All pipes and fittings shall be internally lined with cement mortar in accordance with IS:11906/AWWA C602. Cement mortar in lining shall be applied in-situ after pipe laying and after sectional hydraulic testing.

Cement shall be Portland cement in accordance with IS 8112

Sand used for lining shall be tested with standard sieves as per IS 460 and requirements specified in IS 11906

The minimum cement content shall be 100 kg/m3 and the water : cement ratio by mass shall be between 0.3 and 0.45:1

The mortar shall stop 100 mm back from the faces of any joints. The end face shall be vertical.

5.12.1 Surface Preparation

The interior surface of the pipe to be lined shall be cleaned to remove all rust, chemical or other deposits, oil, grease and all accumulations of water, dirt, and debris. The cleaning of the surface shall be carried out by the use of suitable chemical or mechanical means to the approval of the Engineer. The extent of cleaning shall be to the satisfaction of the Engineer.

All loose mill scale, dirt, rust, and accumulation of construction debris shall be removed from the interior of the steel pipeline. The pipeline shall be cleaned by use of a power-driven cleaner incorporating revolving brushes on rotating arms.

Immediately prior to the travel of the lining machine through the pipeline, all foreign material shall be removed. This includes small sand and loose mortar

that might have accumulated since the work of preparation of surfaces was completed.

5.12.2 Mix Proportion

Proportion of sand to cement shall not be more than 1.5 parts sand to 1 part by volume. Mortar composing of cement, sand and water shall be well mixed and of proper consistency to obtain a dense, homogeneous lining that will adhere firmly to the pipe surface. The cement mortar mix shall comply with strength and density requirements specified in IS 11906/AWWA C602. No admixtures shall be permitted unless approved by the Engineer.

5.12.3 Thickness of Lining

The lining shall be placed by centrifugal method in one course by a machine traveling through the pipe and discharging the mortar at a high velocity over all pipe sections and long radius bends. The discharge shall be from the rear of the machine so that the freshly applied mortar will not be marked. The rate of travel of the machine and the rate of mortar discharge shall be mechanically regulated so as to produce uniform thickness throughout. The mortar must be densely packed and shall adhere to the pipe wherever applied.

5.12.4 Surface Finish

Mortar lining shall be mechanically trowel led except for the places where hand toweling is expressly permitted by the Engineer.

The lining shall be provided with attachments for mechanically trowel ling the mortar. Both the application and toweling of the mortar shall take place at the rear of the machine so that the freshly placed and trowel ling of the mortar will not be damaged. The trowel attachment shall be such that the pressure applied to the pipe will be uniform and produce a lining of uniform thickness with a smooth and even finished surface free of spiral shoulders. The finished surface of machine placed and trowel led linings in pipe shall be examined according to the following procedure.

Thickness of lining shall be ascertained frequently during placing of mortar and trowel ling using an approved non-destructive method.

In the stretch of pipe that has been lined and trowel led in each day’s run, ten places shall be selected in straight sections of the pipe by the Engineer. In each of the ten places the thickness of the lining shall be re measured by non-destructive means as directed by the Engineers.

Defects in lining including but not restricted to sand pockets, voids, over sanded areas, blisters, cracked and dummy areas, and thin spots shall be removed, and the area shall be repaired to the full required thickness of the mortar lining. Defective areas encompassing the full diameter to the pipe shall be replaced by machine. Defective lining rejected at the time of lining shall be removed before initial set of the mortar. Defective lining rejected after initial set shall be replaced or repaired by the most practical method as determined by the Engineer.

Hair cracks or cracks up to 0.25 mm width and not over 300 mm in length in finished linings may be considered acceptable at the discretion of the Engineer but larger cracks shall be repaired or removed and redone all as directed by the Engineer.

5.12.5 Hand application

Cement mortar lining of bends, specials, areas closely adjacent to valves and other such places where machine placing may not be practical shall be performed by hand. The Engineer may order the correction for any defect by hand application.

Cement mortar for hand work shall be of the same materials as the mortar for machine placed lining.

The areas to be lined shall be thoroughly cleaned as specified earlier and, if necessary, shall be moistened with water immediately prior to placing the hand- applied mortar.

Steel finishing trowels shall be used for the hand application of cement mortar, except at bends the outer edges of hand trowel led areas may be brushed in odder to reduce the abutting offset.

All hand finishing work in a section of the pipeline shall be completed within 24 hours after completion of the machine application of mortar lining that section. If necessary, application of mortar lining by machine shall be delayed or stopped to assure compliance with this schedule.

Hand placed mortar shall have a uniform and smooth surface with smooth transitions to adjacent machine placed linings.

5.12.6 Curing

Curing shall commence immediately after completion of the mortar lining and hand finishing of a section of pipeline. This shall, not be later than 8-hours after mixing of mortar. The lining shall be kept continuously in moist condition for a period of 14 days. During the operation of lining, finishing and curing, exterior surface of the pipe exposed to sunlight shall be sprinkled with enough water to keep the pipe cool. Open ends of pipes shall be suitably closed so as to maintain a moist atmosphere and prevent draught. Curing of mortar lining and simultaneous cooling of the pipeline externally shall be continued even beyond the period of 14 days if so directed by the Engineer.

5.12.7 Tests

Test blocks of the same material as used for the lining shall be made in 150 mm cube moulds and subjected to cube crushing tests. Each block shall be removed from its mould as soon as practicable and cured under the conditions of temperature and humidity identical with those in which the lining of the pipe is cured. The number of tests shall be at least 4 cubes for each age and water cement ratio for each days work. The work cube strength of the test cube shall not be less than 300 kg/cm^2 after 28 days of curing or 170 kg/cm^2 of 7 days of curing. The density of the test cube shall not be less than 2300 kg/m^3

5.12.8 Backfilling

On completion of the pipe laying operations in any section, for a length of about 100m and while further work is still in progress, refilling of trenches shall be started by the contractor with a view of restricting the length of open trenches. Pipe laying shall closely follow the progress of trench excavation and the contractor shall not permit unreasonably excessive lengths of trench excavation to remain open while awaiting testing of the pipeline. If the Engineer considers that the contractor is not complying with any of the foregoing requirements, he may prohibit further trench excavation until he is satisfied with the progress of laying and testing of pipes and refilling of trenches. Filling to a level of 300 mm above the crown of the pipe shall be done in accordance with the requirements of the clause on bedding. Care shall be taken during backfilling, not to injure or disturb the pipes, joints or coating. filling shall be carried out simultaneously on both sides of the pipe so that unequal pressure does not occur. walking or working on the completed pipeline shall not be permitted unless the trench has been filled with the instructed bedding and surround material, up to height of at least 300 mm over the top of the pipe except as may be necessary for trapping etc., during backfilling work.

The remaining portion of the trench shall be filled in which selected excavated material free from and topsoil, vegetation or boulders and colds of earth larger than 75 mm in size. Filling shall be done in layers not exceeding 150 mm in thickness accompanied by adequate watering, ramming etc., so as to be compacted to 95 % of the maximum dry density as per Part 7 of IS: 2720. The water contents of the soil shall be kept near the optimum moisture content as possible. The trench shall be refilled so as to build up to the original ground level, keeping due allowances for subsequent settlement likely to take place. The surface of the refilled excavation shall be left slightly higher than the adjacent ground and be maintained by the contractor to a smooth even slope.

The Engineer shall, at all times, have powers to decide which portion of the excavated materials shall be used for filling and in which portion of the site and in what manner it shall be used.

If suitable material for refilling is not available from already excavated material the Contract shall import material of approved quality as directed by the Engineer.

Regular measurement of the field dry density shall be taken by the Contractor at various levels in the backfilling as required by the Engineer.

No mechanical plant other than approved compacting equipment shall run over or operate within the trench until backfilling has reached its final level or the approval for the Engineer has been obtained.

Should any subsidence take place either in the filling of the trenches or near about it during

The works the Contractor shall make good the same at his own cost.

Surplus excavated material shall be used to fill in any low spots above the pipeline which are identified on the Drawings or are instructed by the Engineer. Such material shall be evenly placed and compacted in layers not exceeding 200mm thick after compaction. The method of compaction employed shell achieve not less than 90% maximum dry density as determine from IS 2720: Part 7. Unless approved of by the Engineer, the width of areas to be filled shall not exceed 20m.

5.19 Measurement and Payment

The measurement of the pipes for items specified in Bill of Quantities shall be on running meters of net length along the centerline of the pipe excluding the length of specials and appurtenances.

Specials shall be paid separately on the basis of provision made in the Bill of Quanitities. For the payment purpose, flanges shall be either included in or excluded as described in the Bill of Quantities. However materials such as nuts, bolts, and washers, etc., shall be included in the respective terms.

Valves shall be paid on number basis as mentioned in the Contract Data.

Payment for fabrication of pipes and specials shall be made after successful testing and delivery to work site. Payment for laying the pipes and specials shall be made as mentioned in the Contract Data.

Lining and coating shall be measured by surface area coated or lined in square meters. For coating the outer diameter (before coating) of pipe barrel shall be considered and for lining internal diameter (before lining) of pipe barrel shall be considered.

VI. ANCILLARY STRUCTURES

6.1 The Contractor shall build Valve Chambers & Thrust Blocks/Anchor blocks and such other miscellaneous structures that may be required at the locations shown by the Engineer and as shown in the drawings or as may be otherwise specified or directed. unless otherwise specified in this Chapter or advised by the Engineer based on the site conditions.

The various structures shall be built as the pipe laying progresses and the Engineer at his discretion, may stop work entirely on the laying of pipe or construction of other structures, until the construction of the structures already approved by the Engineer are completed by the Contractor.

6.2 NA.

6.3 NA

6.4 Structures for Crossing Canal/ Nallahs and Other Miscellaneous Structures

Structures for crossing the pipeline over canals/Nallahs and other miscellaneous structures not listed in these specifications but may be required to be built shall be as per construction drawings and as described in Bill of quantities. The materials of construction of workmanship for those structures shall conform to the relevant Standard Specifications. The measurement of quantities involved

in these structures for payment shall be done as per dimensions of the respective drawings.

6.5 Grade of concrete

6.5.1 Ordinary Concrete

In case of ordinary concrete, mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume. The ordinary concrete shall be in four grades designated as M 7.5, M 10, M 15 and M 20. It can also be specified by volumetric mix as given in Table-4 below. For cement which normally comes in bags and is used by weight, volume shall be worked out taking 50 kg of cement as 0.035 cubic meters in volume. Shaking, ramming or hammering shall not be done. Proportioning of sand shall be as per its dry volume and in case it is damp, allowance for 'bulkage' shall be made as per IS: 2386 (Part III).

Ingredients required for ordinary concrete containing one bag of cement for different proportions of mix shall be as given in Table-4 below.

Table-4

Ingredients Required for Ordinary Concrete

Grade of Concrete *	**Nominal Mix by volume Cement: Fine Aggregate: Coarse Aggregate****	**Total quantity of dry in kg (max) by mass per 50 kg of cement (to be taken as the individual masses of fine and coarse aggregates)**	**Quantity of water in liters (max) per 50 kg of cement*****
M 7.5	1:4:8	625	45
M 10	1:3:6	480	34
M 15	1:2:4	350	32
M 20	1:1.5:3	250	30

* In the designation of a concrete mix, letter 'M' refers to the mix and the number refers to the specified 28 days' works compressive strength of that mix on 150 mm cubes, expressed in N/ sq. mm.

** The proportions of the aggregate shall be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger.

*** The amount of water should be kept minimum required for proper workability. The quantity given in the column is not to be exceeded.

6.6 Strength Requirement of Concrete

Where Ordinary Portland Cement conforming to IS.269 or Portland Blast Furnace Cement conforming to IS:455 is used, the compressive strength requirements for various grades of concrete controlled as well as ordinary shall be as given in Table-5. Where rapid hardening Portland cement is used, the 28 days compressive strength requirements specified in Table-5 shall be met at 7 days.

For controlled concrete, the mix shall be so designed as to attain in preliminary tests a strength at least 33 per cent higher than that required on work tests for concrete up to and including M 25, and 25 per cent higher for higher grades. Preliminary tests need not be made in case of 'ordinary concrete'.

Table-5

Strength Requirements

Grade of Concrete	Compressive test Strength on 150 mm cubes after testing in accordance with IS: 516 (N/sq.mm)	
	Minimum at 7 days	Minimum at 28 days
M 10	7	10
M 15	10	15
M 20	13.5	20
M 25	17	25

In all cases, the 28 days compressive strength specified in Table-5 shall alone be the criterion for acceptance or rejection of the concrete.

Where the strength of a concrete mix, as indicated by tests, lies in between the strength for any two grades specified in Table-5, such concrete shall be classified for all purposes as a concrete belonging to the lower of the two grades between which its strength lies.

6.7 Use of Plums in Ordinary Concrete

Stone Plums shall not be used unless specified in the drawings. When stone plums are used, the size may be from 150 to 300 mm. The maximum dimension of these stones or plums shall not exceed 1/3rd the least dimension of the members.

All plums shall be hard, durable, clean and free from soft materials or loose pieces or deleterious substances in them and shall not have sharp corners.

During concreting the first layer of concrete of the specified mix shall be laid to a thickness of at least two and a half times the thickness of the maximum size of plums to be used. The plums shall then be laid while the top portion of this concrete is still green but sufficiently stiff to prevent complete submergence of the plums under their own weight. These plums shall be about half embedded in the concrete and the remaining part exposed so as to form a key with the next layer of concrete. No plums shall be used for concrete-laid under water.

While placing the plums, care shall be taken to see that the clear distance between any two plums is not less than either the width or thickness of either of the plums. The distance from plums to the outer surface or from any steel reinforcement shall be equal to greatest width of the plum.

If plums of stratified stone are used, they shall be laid on their natural bed. Stones with concave faces shall be laid with the concave portion upwards. The thickness of the next and successive layers of concrete shall be at least twice that of the largest plums. The total volume of plums shall not exceed 15% of the volume of the finished concrete.

TECHINCAL SPECFICATION OF BULK FLOW METERS

7.1.1 Introduction

The flow measurement system for bulk flow measurement to be used under this contract shall be electromagnetic type meters with GPRS/GSM. Each water meter intended for a potable water supply. It shall comprise two principal components, as follows:

- A flow sensor of the electromagnetic type, which shall be suitable for installation in a buried water main. The sensor shall be connected to the main by means of PN16 flanged connections. The meter shall be suitable for installation in a flooded chamber and for being directly buried.

- An electronic display unit. This shall be installed in an above ground cabinet enclosure in a convenient location, as close as possible to the water meter.

- The meters proposed should have mandatory provision for the external power supply of 12-24 V DC/AC as well as a battery which shall be integral to the Electronic Display Unit/ Transmitter unit. The power backup through the external battery and by any external UPS **shall not be allowed**.

On a minimum, water meter shall be provided with the following facilities at the electronic display unit:

- integral real-time clock for date and time recording of flow data
- integral data logger for storing data for a minimum of 31 days.
- Serial or suitable communication port to enable data to be passed from the display Unitto display flow and pressure details.
- a second serial or suitable communication port for the temporary connection of a laptop /computer
- Input/output block for connecting GPRS transmitter for the transfer of all display /error codes and status functions from the electronic display unit to central SCADA system, through GPRS communication.
- Meters should be commissioned upon installation of each meter so as All data from the meter can be transferred to the central SCADA System as specified by BWSSB.. PSION and Laptop, leads and appropriate software and software licenses shall be provided to facilitate configuration of the water meters and for down-loading the integral data logger for data analysis.

7.2 General Specifications for Electro Magnetic Flow Meters

a) Full bore electromagnetic flow meter shall consist of flow sensor (i.e. flow tube), flow transmitter and flow indicator and integrator and any other item required to complete the system. To avoid the effects of

disturbances in the velocity profile, a straight and uninterrupted run, upstream as well as downstream from the location of the flow meter shall be provided, as required by the flow meter manufacturer and in line with the applicable standards. Contractor shall finalize the exact location of flow meter in consultation with Engineer.

b) Flow measurement shall not be affected by physical properties of water viz., temperature, pressure etc., within given limits. Contractor shall provide compensating electronic circuits, if required.

c) A lockable enclosure shall be provided for the flow transmitter cum computing unit.

d) Flow meters shall be suitable for the water turbidity at site during various seasons. Flow tube shall be rugged in construction and shall be suitable for continuous operation. Flow tube shall have waterproof construction and shall be suitable for installation on underground /above ground pipe lines.

e). The flow computer and transmitter shall be a single unit suitable for field mounting. It shall accept inputs from flow tube process the signals and shall provide an output proportional to the flow rate. The output shall be 4-20 mA.

a) Particular Specifications:			
1.	Accuracy of flow measurement during FAT	± 0.4% of measured value	
2.	Overall accuracy of flow measurement loop.	± 1.0 % of measured value	
b)	**Flow tube**		
(i)	Application	:	Water applications
(ii)	Type	:	In line, full bore electromagnetic
(iii)	Size of flow tube	:	To suit mains flow parameters, with pipe reducers provided as necessary
(iv)	Process connection	:	Flanged
(v)	Weather Protection Class	:	IP 68 as per IS 13947
(vii)	Material of Construction:		
	Electrodes	:	Hastelloy C276
	Coil Housing	:	non-corrosive
	Flanges	:	Carbon steel
	Grounding ring	:	Hastelloy C276
(viii)	Flow tube Lining	:	*EPDM*
c)	**Flow Transmitter Unit**		

a) Particular Specifications:			
(i)	Type	:	Microprocessor based with facility to configure the ranges.
(ii)	Type of display	:	4 digit backlit LCD / LCD, for flow rate in m3/hr. 8 digit backlit LCD / LCD for totalized flow in ML • Display with 8 digits for main information. Index, menu and status symbols for dedicated information • Key for toggling through the information and reset customer totalizer and call-up function • Selectable default information and accessible menus: - Operator - Meter - Service - Data Logger
(iii)	Units of display	:	• Volume: m3 x 100, l x 100,G x 100, G x 1000, MG,CF x 100, CF x 1000, AF, Al, kl • Flow: m3/min, m3/d, l/s, l/min, GPS, GPH, GPD, MGD, CFS,CFM, CFH
(iv)	Input	:	From flow tube
(v)	Output	:	4-20 mA DC (isolated) proportional to flow rate
(vi)	Power Supply	:	The meters proposed should have mandatory provision for the external power supply of 12-24 V DC/AC as well as a battery which shall be integral to the Electronic Display Unit/ Transmitter unit. The power backup through the external battery and by any external UPS shall not be allowed.
(vii)	Zero and Span Adjustment	:	Factory set Password protection of all parameters and hardware protection of calibration and revenue parameters.
(viii)	Weather Protection Class	:	IP 65 as per IS 13947, IP 67

a) Particular Specifications:

(ix)	Battery backup for totalized flow Type Capacity Backup Time Data Protection:	Online 2.5 Mva Minimum 8 hours considering transfer of real time data to the central server, 2-way communication (minimum 10 polling intervals either way) with the central SCADA server established at BWSSB premises & totalized flow and other related data as required under this contract. • All data stored shall be stored in an EEPROM. Totalizers shall be backed up every 10 min, statistic every hour and power consumption and temperature Measurement every 4 hour. Minimum 31 days of data shall be stored in EEPROM. • Password protection of all parameters and hardware protection of calibration and revenue parameters.
(x)	On line diagnosis & program modification:	Required as following: Diagnostic • Continuous self-test shall include - Coil current to drive the magnetic field - Signal input circuit - Data calculation, handling and storing • Features - Alarm statistics and logging for fault analyzing - Electrode impedance to check actual media contact -Flow simulation to check pulse and communication signal chain for correct scaling - Number of sensor measurements (excitations) - Transmitter temperature (battery capacity calculation)

		- Low impedance alarm for change in media - Flow alarm when defined high flow exceeds - Verification mode for fast measure performance check - Statistic flow and consumption data - The meter shall be configured to accept the meter program modification from the central SCADA server via remote GPRS communication as and when required, transfer error codes to the server for fault analysis
(xi)	Wireless Communication Module	Redundant GPRS modem for Transmission of Process Flow & Totalized Flow data to SCADA system (Make of the Modem shall be of Approved Make List of Flow meters as per Clause No: -6.6)

7.2.1 The Flow Sensor

The sensor shall be suitable for being directly buried and shall have a degree of protection to IP 68 (NEMA6). The sensor shall have PN16 flanged end connections.

The sensor shall be suitable for an operating pressure of 16 bar gauge and a system test pressure of 25 bar gauge.

The metering tube shall be suitably lined to withstand abrasion of the fluid. The lining shall be EPDM and shall have been type-tested in an accredited laboratory and have been shown to be suitable for use in contact with potable water (UKWFBS listed).

The electrodes for sensing the voltage induced in the liquid shall be made of type Hastalloy C267.

The coil housing shall be fabricated from corrosion resistant material capable of submerged or buried operation.

The sensor shall be supplied complete with a factory-fitted umbilical cable for communication with the electronic display unit. The cable length shall be determined by the contractor for each meter location, but shall be not less than 20 metres long so that it can be cut on site to suit the selected location for the electronic display unit. The construction of the signal connectors and cable shall protect the water meter from electromagnetic interference and shall be suitable for buried use and outdoor installation. The cable shall be protected by a suitably robust polyethylene sleeve to prevent accidental damage.

The Contractor shall provide all sundry items such as grounding electrodes and/or grounding rings necessary for satisfactory operation of the sensor.

7.2.2 The Electronic Display Unit

The enclosure of the electronic display unit shall have a degree of protection to IP 65 or better.

The display unit shall have a configurable password protection for accessing the flow meter menu.

The unit shall have LCD displays to show the following parameters, as selected by the operator:

- Cumulative forward flow
- Cumulative reverse flow
- Cumulative net flow
- Instantaneous flow rate
- Instantaneous velocity
- Minimum night flow
- Peak day flow
- Pressure
- Date and time

The user shall be able to configure the electronic display unit to display:

- Cumulative flow in m^3
- Flow rate in m^3/h or l/s
- Velocity in m/s
- Pressure in m or kg/cm2

There shall also be status indicators for each of the following conditions:

- Battery low
- Fault
- Empty pipe

7.2.2 Calibration:

The Electromagnetic flow meter shall be calibrated for the full flow range specified as per BS EN 29104 (Methods of evaluation of electromagnetic flow meters). The calibration method shall be either gravimetric method as per ISO 4185 (Measurement of fluid flow in closed conduits – weighing method).

The ‘test bed’ shall be accredited by national /international certifying authority. The Contractor shall produce accreditation certificates for the test facility and manufacturer calibration certificate for each flow meter, for the review by Engineer. The Contractor shall also demonstrate complete calibration on the test bed in the flow meter laboratory during witnessing of meters as per Clause 6.9. The flow meter shall be acceptable if the accuracy and repeatability is equal to or better than those specified.

7.3 Submissions by the contractor:

Functional Design Specifications: -**UFW Instrumentation**

The Contractor shall submit a complete functional design specification (FDS) for approval by the Engineer within 1 months of the award of the contract. This document shall serve as the primary mechanism by which the Engineer may confirm that the Contractor possesses an accurate understanding of the system and its control requirements. The Contractor is encouraged to obtain clarifications and to suggest refinements to the control descriptions contained in this Specification.

The FDS shall comprise an overall description of the process, its functioning and control, and a detailed description of each section of the control system. The detailed description shall include a step-by-step control description which defines the function of each piece of equipment and each control action and interlock.

The FDS shall describe the 'fail-safe' features incorporated into the design for the event of failure or loss of an input signal affecting a control loop or process sequence.

The FDS shall describe control actions taken and monitoring functions which remain available during a power failure/battery failure, and any automatic controls or sequencing which take place during system start-up and shut-down.

The FDS shall be presented in a clear and precise manner and shall include figures or drawings where appropriate.

The Contractor shall submit and obtain approval of the FDS from the Engineer before beginning the detailed control system design. The contractor should take note of the importance of this obligation.

In general, the submissions of the instrumentation system shall comprise the following as a minimum:

(a) The detailed technical data sheets shall be submitted for all online filed instruments to the Engineer for approval prior to the procurement.

A functional design specification (FDS) for system. This document shall serve as the primary mechanism by which the Engineer may confirm that the Contractor possesses an accurate understanding of the system and its requirements.

The FDS shall include a detailed block diagram of the system with description of the scheme to be provided.

The FDS shall include a description of the interface of Instrumentation system

(Online Flow & Pressure) withcentral SCADA system of BWSSB.

The Contractor shall submit a preliminary FDS and obtain approval before the system architecture design is finalized or detailed design takes place. The Contractor shall formally notify the Engineer for approval of any amendments or additions to the approved FDS. The final FDS shall be submitted for approval before submission of the factory acceptance test definition documents. The Contractor should take note of the importance of this obligation.

(b) Layout drawings for each piece of equipment fabricated or assembled by the Contractor, showing the position of each component with required clearances where applicable, and with overall dimensions.

(c) Wiring diagrams indicating each component of the system and all wiring and cabling thereto, showing manufacturers, types, duties, ranges and nomenclature, with inputs, outputs, cable wiring and terminal identifications clearly marked.

(d) Complete input and output list giving type, circuit number, tag name, short description, outstation, database reference, associated field device, range (if applicable), critical/non-critical alarm status and the like.

(e) Description of quality control methods and approvals.

(f) Detailed works and factory acceptance test procedures.

(g) Program for manufacture, delivery, installation and commissioning.

(h) Appendices, as necessary, to include manufacturer’s literature for each item of equipment supplied.

(i) Operation and maintenance manuals detailing the following:

a. General description and operating principles;

b. Technical description of the equipment (manufacturer’s standard brochures only being acceptable if the particular item of equipment described is clearly designated, adequate information is supplied, and irrelevant information is deleted or otherwise delineated)

c. Complete operating instructions defining the sequence of operations, including flow charts;

d. Procedures for dismantling, cleaning, servicing, replacing parts and reassembling, including recommended clearances and tolerances;

e. Details of all instrument and equipment settings as applicable to this contract;

f. Maintenance and lubrication schedules;

g. Fault diagnosis procedures;

h. Dated and priced list of significant spare parts and special tools, including identification numbers and sources of supply;

i. Simplified arrangement drawings showing all components of the equipment.

(j) General operating manual comprising the following:

a. General description and operating principles;

b. Operating instructions for normal procedures in a step-by-step format including control operations, requirements for display or printing of data, performance monitoring, response to alarms or failures, changing of operational parameters, and manual data entry.

7.4. Factory Tests & Inspection

Each water meter shall be subjected to a hydrostatic test and shall be calibrated in the manufacturer's works prior to dispatch. Calibration and hydrostatic test certificates and QAP shall be provided before disptach.

The contractor shall arrange for witnessing factory tests/ Video conference of the meters test 1 no of meter each size

7.5 Installation

(a) Flow Sensor and Electronic Display Unit

Every electromagnetic water meter shall be installed in accordance with the manufacturer's instructions and recommendations. In particular, the sensor body shall be installed such that it is always full of water to ensure full bore meter operation at all times, even during periods of intermittent supply, and with the electrodes always submerged. This may be achieved by utilizing natural dips in the pipeline, re-laying existing pipes with deflections at joints to create the necessary installation conditions, or creating a low point for the sensor body. Pipe transition slopes shall be such as to ensure any debris suspended in the flow of water is carried through the meter without any deposition. Pipe reducers shall be used to minimize excavation depths and pipework modifications. A slab or plate shall be buried above the sensor to warn other contractors of its location beneath and to provide appropriate protection.

Wherever a water meter is to be installed in a water main with cathodic protection, insulating flanges shall be provided on both sides of the sensor and insulated copper straps shall be installed to provide electrical continuity between the pipes on each side of the sensor.

The electronic display unit shall be installed on a removable backboard in a vandal-resistant weatherproof IP65 floor, wall or post mounting cabinet enclosure. The enclosure shall be constructed from galvanised steel which is at least 3 mm thick. The enclosure shall have a hinged access door, which shall have a facility for padlocking in the closed position. Batteries shall be easily accessible for periodic changing. For floor mounting enclosures, the enclosure shall be mounted on a concrete plinth, the surface of which shall be at least 150 mm above the surrounding finished ground level. A cable duct shall pass through the plinth to enable the cable from the flow sensor to enter the enclosure. A label showing details of the Employer's name and the water meter's unique reference number shall be fixed to the external face of the access door. Contractors or equipment manufacturers details shall not be fixed to the external face of the access door.

The enclosure shall be well-ventilated, dust-proof and vermin-proof, and be suitable for robust use in a tropical climate. It shall also be suitable for:

- The housing of the integral data logger and the temporary housing of a battery powered data logger which could periodically be used in conjunction with the water meter
- the permanent housing of any lightning protection system
- the permanent housing of GPRS transmitter and battery pack, and any other items necessary to facilitate communication with the SCADA system.
- mains pressure recording - see (b) below

Except where the cable is underneath the concrete plinth, there shall be a minimum of 500 mm cover for the cable. The cable shall be surrounded by a sand bedding at least 75 mm thick and interlocking cable protection tiles shall be installed above the cable. An 'electric cable' warning tape shall be installed above the tiles. Wherever practicable, the cable shall be installed at least 600 mm away from any other cables.

Details of the sensor, including its diameter and the size of main together with a unique reference number, shall be permanently indicated on the outside of the cabinet enclosure housing the electronic display unit. A laminated copy of the record plan shall be installed in each meter cabinet.

7.6 Particular Requirements for Field Instruments and Communication Equipment

The Contractor shall commission and make operational the field instruments and communication equipment's upon installation. Please note that the Contractor has to bear all communication costs including SIM charges &internet and any other cost during the construction period , defect liability period.

7.7 Transferring Field Data to SCADA System:

The data from Bulk Flow meters should be transferred to BWSSB Server(The Server shall be provided by BWSSB)

B- Scope of Work for Integration:

As part of this current contract, the contractor's scope of work on a minimum shall include to transmit the data from each bulk meter to the central server via wireless redundant communication link (GPRS). During detailed engineering (DDE), the final integration server (central SCADA server) tie in point shall be finalized between BWSSB and the contractor for the data to be transmitted to the central server.

As part of scope of work in this contract, the contractor shall conduct a interoperability test to confirm & demonstrate that the data from the bulk flow meters can be received & transmitted by the central SCADA server using appropriate OPC server & client software. The test shall be carried out in presence & co-ordination with the central SCADA server.

The contractor shall note that the bulk flow meter data which is to be transmitted to the central SCADA server server is to be mapped / programmed in the same format as required at central SCADA server for integration. Ensuring that the data is as per the format required by the central SCADA server shall be part of integral park of the contract. The contractor shall be responsible for the availability of bulk flow meter data at the integration Front end processor servers (FEP) end at all times. Contractor shall note the importance of this clause.

The contractor shall be responsible for the instrumentation system in transferring their data from various online field instruments to Central SCADA system.

SECTION 7: DRAWINGS

SECTION 8: BILL OF QUANTITIES

Note:

(1) Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities (refer: ITB Clause 7.2 and CC Clause 33.2).

(2) Unit rates and prices shall be quoted by the Tenderer in Indian Rupees.

(3) Where there is a discrepancy between the rate in figures and words, the lower of the two will govern. [ITB Clause 19.1(a)]

(4) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by quantity, the unit rate quoted shall govern [ITB Clause 19.1 (b)]

Executive Engineer

(UF

W)-2 Division

SECTION 9

FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

To: _____ [name of Employer]

_____ [address of Employer]

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rs._____ [amount of guarantee] [2]Rupees_____[in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of -_____ [amount of guarantee][3]as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 30 days from the date of expiry of the Defects Liability Period.

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[2]An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract

[3]An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract

Executive Engineer

(UFW)-2 Division

Signature and seal of the guarantor _____

Name of Bank _____